CLAIMS

1. A time domain reflectometry method for determining properties of a transmission channel, characterized in that it comprises the steps of generating, at one end of the channel, a plurality of pulses (40, 42, 44) covering different frequency bands, and of processing the echoes provided by these pulses at the same end (12) of the channel.
2. A method according to claim 1, characterized in that the frequency bands of the generated pulses are overlapping.
3. A method according to claim 2, characterized in that the overlapping of the frequency bands is such that, after reflection and processing, the frequency spectrum is practically flat.
4. A method according to any of claims 1-3, characterized in that each generated pulse is provided with a given amplification (48) or attenuation and the received pulses are provided with the corresponding attenuation (50) or amplification.
5. A method according to any of the previous claims, characterized in that the signals received are submitted to a synchronous averaging (52).
6. A method according to any of the previous claims, characterized in that the received signals are submitted to a matched filtering (54).
7. A method according to any of the previous claims, characterized in that the received signals are submitted, at least for the medium and high frequency pulses, to a noise suppressing step (56) comprising the estimation of the noise for the part of the received signal after the channel end echo and the determination of a threshold above which the signals are taken into consideration.
8. A method according to any of the previous claims, characterized in that the received signals are processed in their own frequency bands and added (60) after processing.
9. A method according to claim 8, characterized in that the variation with time of the modulus of the received signals is detected and/or the variation with time of the frequency of the received signals is detected.
10. A method according to any of the previous claims, characterized in that the pulses are complex analytical pulses.
11. A method according to any of the previous claims, characterized in that the frequency bandwidth and the amplitude of the low frequency pulses (40) are selected according to the channel attenuation and its compliancy in terms of egress.

12. A method according to any of the previous claims characterized in that the pulses are generated sequentially or simultaneously.

13. Application of the method according to any of the previous claims to the determination of locations of defects of the channel.

14. Application of the method according to any of claims 1-12 to the properties of a telephone line between a central office (12) and a subscriber (14), the measurement being made at the central office.

15. A method for testing the properties, such as the attenuation, of telephone lines comprising copper pairs, for instance twisted pairs, between a central office and a subscriber, characterized in that it makes use of the time domain reflectometry.

16. A method according to claim 15, characterized in that the time domain reflectometry comprises the steps of generating, at one end of the channel, a plurality of pulses (40, 42, 44) covering different frequency bands, and of detecting the echoes provided by these pulses at the same end (12) of the line.

17. An apparatus for testing the properties, such as the attenuation, of telephone lines comprising copper pairs, for instance twisted pairs, between a central office and a subscriber, characterized in that it comprises time domain reflectometry means.

18. An apparatus according to claim 17, characterized in that it comprises means for generating, at one end of the line, a plurality of pulses (40, 42, 44) covering different frequency bands, and means for processing the echoes provided by these pulses at the same end (12) of the channel.

19. An apparatus according to claim 18, characterized in that the means for generating a plurality of pulses covering different frequency bands are such that the frequency bands are overlapping.

20. An apparatus according to claim 19, characterized in that it comprises means for processing the reflected pulses such that the frequency spectrum is practically flat after reflection and processing.

21. An apparatus according to any of claims 18-20, characterized in that the pulse generating means comprise, for each generated pulse, amplification (48) or attenuation means and in that on the received in side, it comprises, for each pulse, complementary attenuation (50) or amplification means.

22. An apparatus according to any of claims 18-21, characterized in that it comprises synchronous averaging means for the received signals.

23. An apparatus according to any of claims 18-22, characterized in that it comprises matched filtering means (54) for the received signals.

24. An apparatus according to any of claims 18-23, characterized in that it comprises noise suppressing means (56) for the received signals, these noise suppressing means including means for estimating the noise for the part of the received signals after the channel end echo and means for determining a threshold above which the signals are taken into consideration.

25. An apparatus according to any of claims 18-24, characterized in that it comprises means for processing the received signals for each frequency band and means for adding the processed signals.

26. An apparatus according to claim 25, characterized in that it comprises means for detecting the modulus of the received signals and/or the variation with time of the frequency of the received signals.

27. An apparatus according to any of claims 18-26, characterized in that it comprises means for receiving complex analytical pulses.

28. An apparatus according to any of claims 18-27, characterized in that it comprises means for selecting the frequency bandwidth and the amplitude of the low frequency pulses according to the line attenuation and its compliancy in terms of egress.

29. An apparatus according to any of claims 18-28 characterized in that it comprises means for generating the pulses sequentially or simultaneously.